

CHAPTER 9

DIET AND NUTRITION

This chapter is concerned with the nutritional requirements for the healthy person, and for the sick, wounded, and convalescing patient. Research has confirmed that good health depends in part upon the availability of essential nutrients the body requires throughout life. The well-nourished individual is usually mentally alert, is at a maximum of physical capability, and has a high resistance to disease. The daily basic minimum nutritional requirements must be met and often supplemented during periods of illness to meet the changing needs of the body and its ability to use foods. Therefore, the diet is an important factor in the therapeutic plan for each patient.

The important role of nutrition in overall health is widely recognized. As a member of the Navy, you must be healthy to perform your professional duties. Part of maintaining a healthy lifestyle starts with eating a well-balanced diet and maintaining a good fitness regimen. Many people in the Navy and Marine Corps do not maintain a proper daily diet. As a Hospital Corpsman, you may be responsible for providing nutritional counseling and, perhaps, even motivation. You have an added responsibility to observe for additional nutritional needs and omissions and to advise your shipmates when necessary. If you stay healthy and energetic, the knowledge and experience you share and the example you set may help your shipmates adopt and maintain a healthier lifestyle.

Balancing energy intake and expenditure can be difficult, both when activity levels are high as well as when they are very low. Typically, body weight remains constant when energy intake equals expenditure (fig. 9-1). The energy balance equation can be “unbalanced” by changing energy intake, energy expenditure, or both. To gain or lose 1 pound requires that approximately 3,500 extra calories be consumed or burned.

FOOD CLASSIFICATION

LEARNING OBJECTIVE: *Identify the components of good nutrition.*

Foods are substances from animal and plant sources that yield heat and energy when ingested and

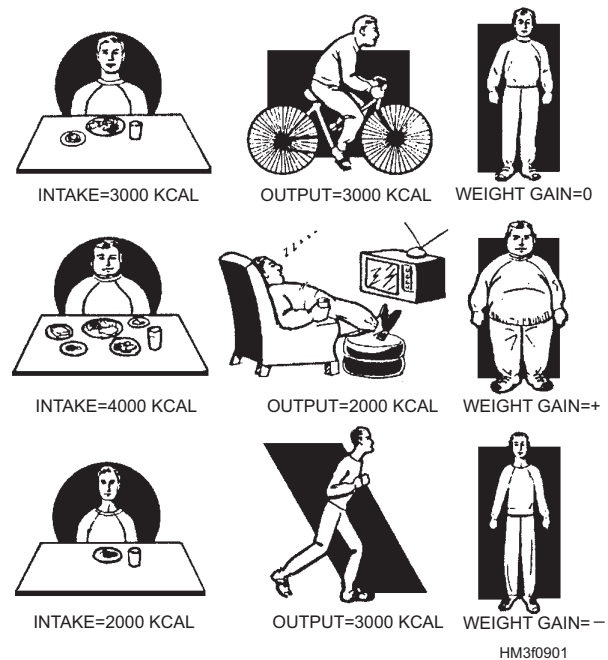


Figure 9-1.—Balancing energy intake.

absorbed by the body. Food nutrients build and renew tissues and regulate the body processes. The unit commonly used for describing energy intake and energy expenditure is the calorie. Good food sources contain substantial amounts of nutrients in relation to caloric content and provide upwards of 10 percent of the U.S. Recommended Dietary Allowance for each specific nutrient. Most people can get enough of each required nutrient daily by eating a wide variety of foods.

PROTEINS

Proteins are the “building blocks” of the body and provide important required nutritive elements. Proteins are needed for growth, maintenance, and replacement of body cells, and they form hormones and enzymes used to regulate body processes. Extra protein is either used to supply energy or is changed into body fat. Found in both the animal and plant kingdoms, all proteins are composed of amino acids. Some amino acids are absolutely essential to maintain life and are necessary for repair, growth, and body development. Of the approximately 20 amino acids,

our body can produce all but nine. These nine amino acids are termed “essential amino acids.” We must get them from food, and we need all nine at one time so our body can use them effectively.

Proteins, which promote tissue growth and renewal, have long been recognized as the main structural unit of all living cells. Each gram (g) of protein yields 4 calories in the process of metabolism. Although proteins yield energy, they are an expensive source. If sufficient carbohydrates are not supplied, the body will use protein for energy requirements. This protein may be obtained from muscle tissue, producing the “wasting effect” of long-term starvation and some diseases.

A constant protein source is required in the daily diet. The normal daily protein intake for adults should be 0.8 gram per kilogram (g/kg) (2.2 lbs) of body weight, or 12 percent of the total caloric intake. Pregnant women require an additional 10 grams of protein a day over the normal daily intake.

Proteins play an important role in recovering from fractures, burns, and infections. They are also important in healing wounds and recovering from surgical procedures. In cases of recovery, protein intake should be increased in accordance with the severity of the condition, and carbohydrates and fats can be added liberally. While proteins can supply energy, they are not a main source of energy like carbohydrates and fat.

Ideally, the patient should receive protein by mouth; however, it is sometimes necessary to meet the minimum requirements parenterally. Glucose parenteral solution, given during an acute emergency period, will prevent some loss of protein. Protein deficiency may stunt growth, promote a secondary anemia, or induce nutritional edema. Dietary sources of protein and the nine essential amino acids are milk, yogurt, eggs, meats, fish, cheese, poultry, peanut butter, legumes, and nuts. Protein from plant sources is best when combined with animal protein, such as milk plus peanut butter, or when legumes are combined with grains, such as Navy beans plus rice.

FATS

The chief functions of fats are to supply energy and transport fat-soluble vitamins. Each gram of fat yields 9 calories. Fats provide the most concentrated source of calories (and, therefore, energy) of all the food nutrients. Fats are found in both the animal and

vegetable kingdoms. Fatty acids and glycerol are the end products of the digestion of fats.

Many fats act as carriers for the fat-soluble vitamins A, D, E, and K. They also act both as a padding for vital organs, particularly the kidneys, and as subcutaneous tissue to help conserve body heat. Fat is stored as adipose (fatty) tissue to form a reserve supply in time of need. Dietary fats delay gastric emptying and promote a feeling of fullness. Excess calories from fats may produce obesity, the forerunner of arteriosclerosis, hypertension, gallbladder disease, and diabetes. A diet high in fat, especially saturated fat and cholesterol, contributes to elevated blood cholesterol levels in many people. Adults over the age of 30 should have a serum cholesterol level of less than 200 mg/dl. Health experts agree that less than 30 percent of our total calories per day should come from fat. Saturated fat intake should be no more than 10 percent of the total calories.

Reducing dietary fat is also a good way to limit calories. Decreased fat intake results in fewer calories without a reduction of most nutrients. Too little fat in the diet may lead to being underweight, having insufficient padding for the vital organs, and lowered energy. Butter, margarine, cream cheese, fatty meats, whole milk, olives, avocados, egg yolks, nuts, commercial bakery products, and vegetable oils are all sources of dietary fat.

CARBOHYDRATES

Carbohydrates (sugar and starches) are the most efficient sources of energy and are known as the “fuel of life.” They are abundantly found in most plant food sources. Complex carbohydrates (starches) are in breads, cereals, pasta, rice, dry beans and peas, and other vegetables, such as potatoes and corn. Simple carbohydrates are found in sugars, honey, syrup, jam, and many desserts. The new nutritional guidelines established by the Food and Drug Administration (FDA) recommend that complex carbohydrates and naturally occurring sugars (found primarily in fruit) make up approximately 50 percent of one’s total caloric intake. The FDA also recommends that refined and processed sugars make up no more than 10 percent of the calories in one’s diet.

Each gram of carbohydrate yields 4 calories in the process of its metabolism. Carbohydrates must be reduced to glucose before the body can use them. Carbohydrates are stored in the muscles to fuel their movement, and in the liver as glycogen, which is then

broken down and released as glucose at the exact rate needed by the body. This latter mechanism is controlled largely by insulin from the pancreas. During fasting, liver glycogen is rapidly depleted, leading the body to use its fat for energy. Carbohydrates that are not needed for energy are converted to and stored as adipose (fat) tissue.

The main functions of carbohydrates are to

- furnish the main source of energy for muscular work and nutritive processes,
- help maintain body temperature,
- form reserve fuel,
- assist in oxidation of fats, and
- spare protein for growth and repair.

MINERALS

Although mineral elements constitute only a small portion of the total body weight, they enter into the activities of the body to a much greater degree than their weight would indicate. Certain mineral elements are essential for specific body functions. While it is not yet known exactly how many of the mineral elements are indispensable to the body functions, seemingly small changes of mineral concentration can be fatal. These essential inorganic elements contribute overwhelmingly to the skeletal framework of the body and teeth, and they are an essential part of many organic compounds.

Minerals form an integral part of basic cell structure and circulate in body fluids. They also exercise specific physiologic influences on the function of body tissues. For mineral needs to be met satisfactorily, consumption of each element must be sufficient to cover body tissue requirements and to meet changing physiological needs. At one time, it was erroneously believed that any diet adequate in other respects would also provide an adequate intake of essential minerals. This is not so. Foods vary greatly in their mineral—as well as their overall nutritional—content, depending on growing conditions, storage, and preparation procedures. Among the major minerals are calcium, phosphorus, iron, potassium, zinc, and magnesium. Table 9–1 lists the essential elements, the foods that contain them, and their functions.

VITAMINS

Vitamins are essential compounds that are present in food in minute quantities. Although vitamins do not furnish energy or act as tissue-building materials, they do act as catalysts in many body chemical reactions and are necessary for normal metabolic functions, growth, and the health of the human body. Their absence results in malnutrition and specific deficiency diseases. Vitamin chemistry is complex and nutritional experimentation is difficult, so our knowledge of them is being continually supplemented and revised. It is quite possible that additional vitamins will be discovered or that some of those already recognized may prove to contain more than one factor.

Vitamins are so widely distributed in food that a properly prepared normal diet usually provides an adequate amount. Vitamins can be destroyed during the preparation or preservation of certain foods; however, manufacturers frequently add vitamins to their products to replace those destroyed or removed in processing. Since fat-soluble vitamins can be stored in the body, it is possible to develop hypervitaminosis by consuming excessive amounts of these nutrients, and death may result in extreme cases. Fat-soluble vitamins include A, D, E, and K.

- **Vitamin A** is involved in the formation and maintenance of healthy skin, hair, and mucous membranes. Vitamin A helps us to see in dim light and is necessary for proper bone growth, tooth development, and reproduction. Good sources of vitamin A include yellow, orange, and dark green vegetables; fruits; and liver, eggs, cheese, butter, and milk.
- **Vitamin D** promotes calcium and phosphorus absorption and is required for the formation of healthy bones and teeth. Good sources include fortified milk, egg yolk, liver, tuna, and cod liver oil. Vitamin D is produced in the body on exposure to sunlight.
- **Vitamin E** protects vitamin A and essential fatty acids from oxidation in the body cells and prevents breakdown of body tissues. Good sources include vegetable oils, fortified cereals, whole-grain cereals and bread, nuts, wheat germ, and green leafy vegetables.
- **Vitamin K** includes a group of vitamins that promote normal clotting of the blood and helps maintain normal liver functions. Good sources

Table 9–1.—Mineral Elements in Nutrition

Element	Rich Sources	Function in the Body
Iodine	Seafood, water, and plant life in nongoiterous regions, and iodized salt	Assists in normal functioning of the thyroid gland.
Sodium	Table salt, seafood, animal products, and foods processed with sodium	Regulates osmotic pressure, pH balance, and heartbeat.
Potassium	Avocados, bananas, oranges, potatoes, tomatoes, nuts, meat, coffee, tea, milk, and molasses	Regulates osmotic pressure and pH balance. A constituent of all cells.
Magnesium	Nuts, whole-grain cereals, legumes, and vegetables	Assists in maintaining mineral balance.
Calcium	Milk, yogurt, cheese, some green vegetables, molasses, sardines, and salmon	Assists in blood coagulation; regulates heartbeat, aids in regulating mineral metabolism and muscle and nerve response. A constituent of bones and teeth.
Phosphorus	Milk, yogurt, poultry, fish, meats, cheese, nuts, cereals, and legumes	Aids in metabolizing organic foodstuffs and maintains pH balance. A constituent of bones and teeth.
Iron	Liver, egg yolks, oyster, legumes, whole or fortified grains, dark and green vegetables, and dried fruit	Helps carry oxygen throughout the body. A constituent of hemoglobin, blood, and tissue.
Chlorine	Table salt, seafoods, and animal products	Regulates osmotic pressure. A constituent of gastric acid.
Sulphur	Protein foods	Promotes hair and nail formation and growth. A constituent of all body tissue.
Copper	Liver, kidney, nuts, dried legumes, some shellfish, and raisins	Aids in the use of iron in hemoglobin synthesis.
Zinc	Meat, liver, eggs, seafood (especially oysters), milk, and whole-grain products	Regulates growth, taste acuity, and appetite. A constituent of enzymes.

are green leafy vegetables, liver, soybean, and other vegetable products.

Water-soluble vitamins, such as vitamin C and the B-complex vitamins, are not stored in the body to any great extent. Rather, they are used as necessary by the body, and any amounts that remain are excreted in the urine. As a result, these vitamins must be replenished daily to ensure optimum health.

- **Vitamin C** (ascorbic acid) is necessary for normal growth and cell activity and is important for maintaining blood vessel strength. It helps

the body resist upper respiratory infections and is necessary for the proper development of teeth and gums. Wounds and burns require vitamin C for healing. A deficiency of ascorbic acid causes an individual to bruise easily. A severe deficiency leads to a condition known as scurvy. Good sources include citrus fruits, raw leafy vegetables, and tomatoes.

- **Vitamin B (Complex)** includes more than 12 separate B vitamins. Some of the more common B vitamins are

—**Thiamin (B₁)** is necessary for normal growth, normal carbohydrate metabolism and normal functioning of the heart, nerves, and muscles. Thiamin deficiency results in retarded growth and nerve disorders, and a condition known as beriberi. Good sources include pork, fish, eggs, and whole-grain cereals.

—**Riboflavin (B₂)** is required for normal growth, vigor, healthy skin and mucosa, and normal eye function. Riboflavin is found in milk products, green leafy vegetables, and eggs. Other good sources of vitamin B₂ are the organ meats, heart, kidney, and liver.

—**Niacin (B₃)** is necessary for normal growth and skin health, normal functioning of the stomach and intestines, nervous and circulatory systems, and for carbohydrate, fat, and protein metabolism. The best sources are meat, liver, poultry, and peanuts.

—**Pyridoxine (B₆)** is necessary for fat, carbohydrate, and protein metabolism, and is sometimes used to treat nausea in pregnancy. Sources include liver, yeast, wheat germ, pork, potatoes, and milk. Vitamin B₆ is usually prescribed with Isonizid (INH) treatment since INH often causes a pyridoxine deficiency.

—**Cyanocobalamin (B₁₂)** is necessary for the health of nervous tissue and assists in iron metabolism and the maturation process of red blood cells. B₁₂ is used to prevent pernicious anemia. The best sources are liver and kidneys, milk, eggs, fish, and cheese.

See Appendix IV for more information on vitamins.

VITAMIN AND MINERAL SUPPLEMENTS

Vitamin supplements are usually not necessary if a diet includes a wide variety of foods. Exceptions may occur in prenatal diets in which iron is low, as well as in patients who are deficient in a specific vitamin. Vitamin supplements should be taken only on a physician or dietitian's recommendation.

Vitamin and mineral supplements are being widely used by physically active people because of all the

performance-enhancing claims made by supplement manufacturers. It is estimated that 40–50 percent of athletes use some form of vitamin/mineral supplements. Some doses range from amounts similar to the Recommended Dietary Allowances (RDA) up to levels many times the RDA. Supplements are useful under a variety of conditions, such as if an individual

- has an existing vitamin or mineral deficiency;
- has poor nutrient intake and/or dietary habits; or
- is exposed to extreme environmental conditions, such as altitude.

Often, laxatives are prescribed in conjunction with some medical treatments and may cause decreased absorption of vitamins, loss of minerals and electrolytes, or inhibition of glucose uptake. Therefore, any patient on laxatives should be carefully monitored, and supplementary nutritives should be administered as necessary.

Taking a general multivitamin supplement appears to be without measurable performance enhancing effects in healthy, well-nourished, physically active personnel. Similarly, no improvements in muscle strength or endurance have been noted in strength athletes, such as body builders, who tend to use megadoses of vitamin and mineral supplements. The indiscriminate use of high-potency vitamins and minerals is of growing concern since excessive amounts of vitamins and/or minerals can be harmful and may result in nutrient imbalances. Excessive intake of some vitamin and mineral supplements can result in adverse—and possibly toxic—side effects.

WATER

Water is often called the “forgotten nutrient.” Water is needed to replace body fluids lost primarily in urine and sweat. A person can survive weeks without food but only days without water. Water makes up 70 percent of body weight and is found in every cell in the body. It is the medium through which nutrients are transported from the digestive tract to the cells where they are needed. Water is also the medium through which the by-products of cell metabolism are removed.

Water also serves as the medium in which the chemical processes of life take place. It is normally taken into the body in beverages, soups, and in the form of solid foods. Fluid needs are increased with sweating, vomiting, diarrhea, high-protein diets, and in hot environments. An insufficient intake may cause dehydration, evidenced by loss of weight, increased body temperature, and dizziness.

GUIDE TO GOOD EATING

LEARNING OBJECTIVE: *Recall the elements of the USDA Food Guide Pyramid and recommended dietary guidelines.*

Calculating a therapeutic diet can be complicated and is best left to dietitians. It is now common practice for dietitians or dietary kitchens to select foods for diets using the food groups outlined in figure 9-2, the Food Guide Pyramid. These foods are classified according to their nutritional value and the number of servings that should be eaten each day.

THE FOOD GUIDE PYRAMID

The Food Guide Pyramid emphasizes foods from the five food groups shown in the sections of the pyramid. Each of these groups provides some, but not

all, of the nutrients we require. For good health we need them all. For everyday living, the simplest and most practical plan is to follow those same guidelines, selecting from the various food groups the type and amount of food recommended.

DIETARY GUIDELINES

The food pyramid graphically communicates the message of the Dietary Guidelines for Americans. Diets should be built upon a base of complex carbohydrates and less fats. The placement of the food groups starting at the base of the pyramid conveys the current recommendations. These recommendations are as follows:

- Eat more grains, vegetables, and fruits
- Eat moderate amounts of lean meats and dairy foods
- Use sweets, fats, and oils sparingly

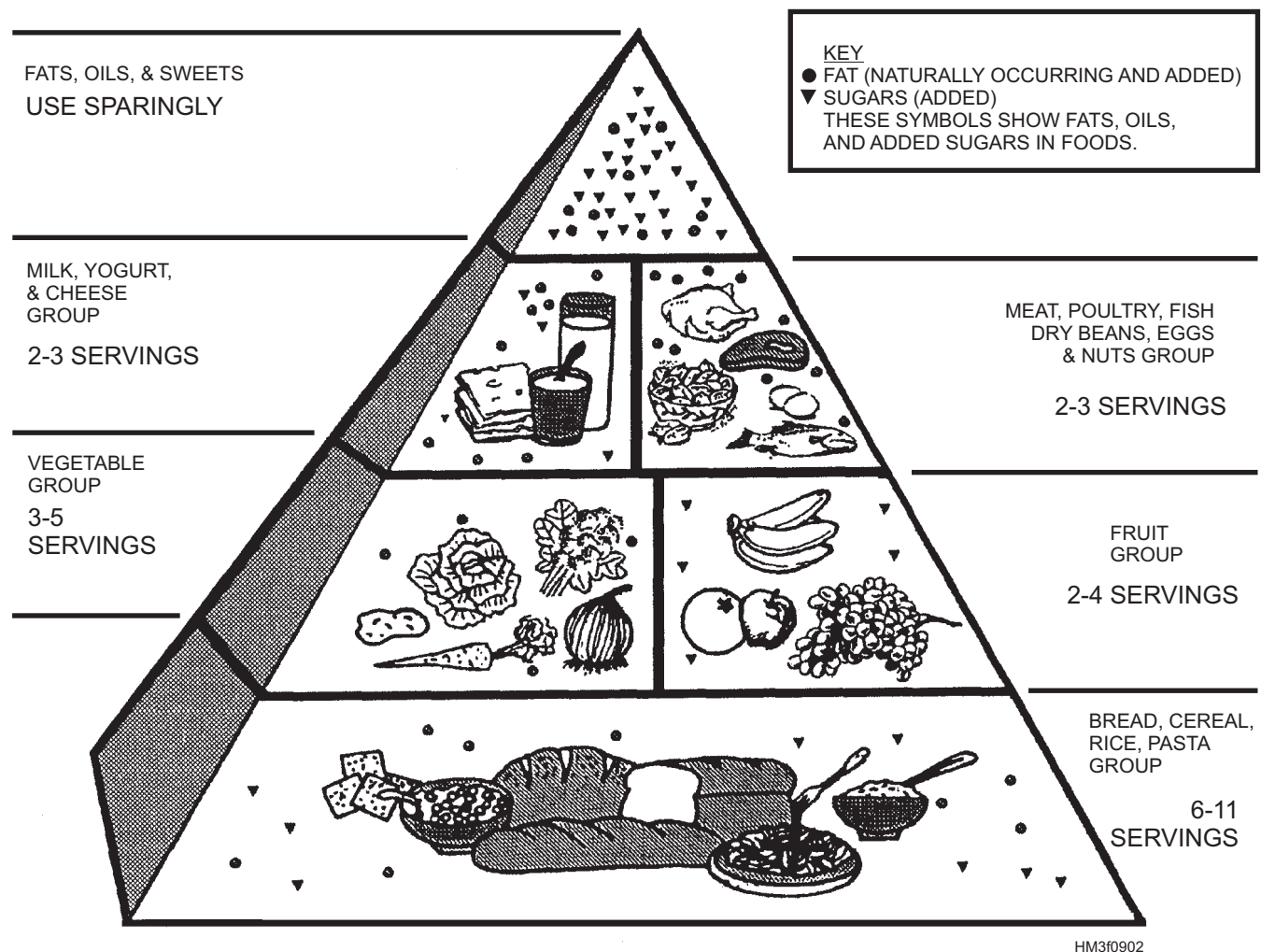


Figure 9-2.—Food Guide Pyramid.

Generally accepted guidelines suggest that you eat a diet that is high in complex carbohydrates and low in protein and fat. Your diet should consist of at least five combined servings of fruits and vegetables each day. Avoid fat when possible. Eat at regular intervals when possible, and avoid snacking late at night. For detailed information on nutrition, consult *Navy Nutrition and Weight Control Guide*, NAVPERS 15602; and the *Fat, Cholesterol and Calorie List for General Messes*, NAVSUP 580.

DIET THERAPY

LEARNING OBJECTIVE: *Select the appropriate diet for various medical conditions.*

It is often necessary to cater to a patient's appetite, since many individuals become especially hard to please when sick. In some disease states, such as cancer, patients experience marked taste changes. Because of the importance of the nutritional elements in feeding the sick, try to carry out the patient's wishes whenever possible. A tactful and observant Hospital Corpsman can be of great benefit to the physician and dietitian in carrying out the dietary regimen. You must be aware of what comprises a well-balanced diet and should be able to recognize when dietary adjustments need to be made in special situations. This is important to meet the changing needs of the diseased body's ability to make use of foods.

The patient should be made to feel that the utmost cleanliness and care have been observed in the preparation and service of their food. The patient's face and hands should be cleaned before food is served, and the lips and teeth cleaned before and after the meal. If the mouth is dry, it should be moistened periodically.

When special or modified diets are ordered, check the contents of the tray with the written orders. An error in serving a special diet may cause discomfort, serious illness, or even death.

OBJECTIVES OF DIET THERAPY

The objectives of diet therapy are as follows:

- To increase or decrease body weight
- To rest a particular organ

- To adjust the diet to the body's ability to use certain foods
- To produce a specific effect as a remedy (e.g., regulation of blood sugar in diabetes)
- To overcome deficiencies by the addition of food rich in some necessary element (e.g., supplementing the diet with iron in treating macrocytic anemia)
- To provide ease of digestion by omitting irritating substances, such as fiber, spices, or high-fat foods

TYPES OF DIETS

Diets used in the treatment of disease are often spoken of by specific names that show a special composition and often indicate the purpose for which the diet is intended.

Regular Diet

The regular diet is composed of all types of foods and is well balanced and capable of maintaining a state of good nutrition. It is intended for convalescing patients who do not require a therapeutic diet.

Modified or Therapeutic Diets

Modified or therapeutic diets are modifications of the regular diet and are designed to meet specific patient needs. These include

- method of preparation (e.g., baking, boiling, or broiling),
- consistency (e.g., ground or chopped),
- total calories (e.g., high or low calorie),
- nutrients (e.g., altering carbohydrate, protein, fat, vitamins, and minerals), and
- allowing only specific foods (e.g., diabetic diet).

SOFT DIET.—The soft diet is soft in texture and consists of liquids and semi-solid foods. It is indicated in certain postoperative cases, for convalescents who cannot tolerate a regular diet, in acute illnesses, and in some gastrointestinal disorders. A soft diet is an intermediate step between a liquid and regular diet and is low in connective tissue and indigestible dietary fiber. Little or no spices are used in its preparation.

The soft diet includes all liquids other than alcohol, and foods that may be incorporated into a soft

diet include well-cooked cereals, pastas, white bread and crackers, eggs, cottage cheese, tender meat, fish, poultry, and vegetables (including baked, mashed, and scalloped potatoes). Vegetables can be puréed and meats ground for dental patients. Permitted desserts are custards, gelatin puddings, soft fruits, and simple cakes and cookies. Foods prohibited in a soft diet include fried foods, raw vegetables, and nuts.

LIQUID DIET.—A liquid diet consists of foods that are in a liquid state at body temperature. This type of diet is indicated in some postoperative cases, in acute illnesses, and in inflammatory conditions of the gastrointestinal (GI) tract. It is important that feedings consisting of 6 to 8 ounces or more be given every 2 to 3 hours while the patient is awake.

Liquid diets are usually ordered as clear, full, or dental liquid. A **clear liquid diet** includes clear broth, black tea or coffee, plain gelatin, and clear fruit juices (apple, grape, and cranberry), popsicles, fruit drinks, and soft drinks. This diet is inadequate in all nutrients. A **full liquid diet** includes all the liquids served on a clear liquid diet, with the addition of strained cream soups, milk and milk drinks, ice cream, puddings, and custard. The full liquid diet is inadequate in iron, niacin, and possibly Vitamin A and thiamin. A **dental liquid diet** includes regular foods blended and strained in liquid form and all foods allowed on clear and full liquid diets. Vitamin and mineral supplements may be necessary with the dental liquid diet if the recommended amounts of food are not tolerated.

HIGH-CALORIE DIET.—The high-calorie diet is of a higher caloric value than the average patient normally requires. A high-calorie diet is indicated when an increase of total calories is required by malnourished, underweight, postsurgical, or convalescing patients, especially those recovering from acute illnesses such as infections, burns, and fevers. The increase in calories is obtained by supplementing or modifying the regular diet with high-calorie foods or commercial supplements, by giving larger portions, or by adding snacks. It is given to meet a need for energy caused by the more rapid metabolism that accompanies certain diseases (especially fever, hyperthyroidism, poliomyelitis, and tuberculosis). In the liquid or soft diet, adding fats and carbohydrates increases the caloric value. The high-calorie diet is often ordered along with high protein. Proteins are added to prevent depletion of proteins in the plasma (a condition known as hypoproteinemia). As the patient progresses, a more solid diet is given.

Good sources of high-calorie foods are whole milk, cream, sweets, butter, margarine, fried foods, gravy, sauces, and ice cream. Between-meal feedings consisting of milk, milkshakes, cheese, cookies, or sandwiches are recommended, but these feedings should not interfere with the patient's appetite at mealtime.

HIGH-PROTEIN DIET.—As previously stated, protein is essential for tissue growth and regeneration. A high-protein diet is indicated in almost all illnesses (e.g., nephrosis, cirrhosis of the liver, infectious hepatitis, burns, radiation injury, fractures, some GI disorders, conditions in which the protein blood level is low, and in preoperative and postoperative cases).

In some acute illnesses and disorders, such as infectious hepatitis, GI disorders, and postoperative conditions, patients may be unable to consume solid foods or the daily requirement of protein and calories because of pain or nausea. In these cases, intravenous fluids with nutrient additives are required for the patient to receive the required amount of protein.

Protein-calorie deficiency is a definite factor in postoperative wound disruption. This disruption can best be prevented by preemptive nutritional measures before surgery. Antibody production will be decreased if the patient receives inadequate protein. Remember, the daily recommended intake of proteins for adults is at least 0.8 g/kg of body weight (approximately 56 g). A high-protein diet should provide a minimum of 1.5 g of protein per kg of body weight (approximately 105 g). The seriously burned and radiation injury patients should receive at least 3.0 g/kg daily.

Supplement the regular diet with high-quality protein foods, such as meat, fish, cheese, milk, and eggs.

LOW-CALORIE DIET.—The low-calorie diet is useful in the treatment of obesity, but it may also be used to control weight in medical conditions such as arthritis, hypertension, diabetes, cardiac disease, or hypothyroidism. A loss of 1 to 2 pounds per week is the medically acceptable limit for weight reduction. A low-calorie diet consists of 1,000 to 1,800 calories per day. Calorie levels are determined by physicians and dietitians to help meet specific individual patient weight-loss goals. The daily intake of proteins should be at least 0.8 g/kg of standard body weight. Supplemental vitamins may be ordered if the prescribed diet is less than 1,200 calories.

Patients on low-calorie diets should be instructed by the dietitian (if available) or other medical

personnel knowledgeable in proper eating habits. The dietitian conducts patient interviews to learn the patient's eating behaviors, usual portions, preparation of foods, meal patterns, nutritional adequacy, exercise, and so forth. Individual programs should then be recommended to assist patients to attain and maintain their ideal weight.

The *Handbook of Clinical Dietetics*, published by the American Dietetic Association, lists the following formula for determining ideal body weight. For females, the basic weight for 5 feet is 100 pounds. Add 5 pounds for every inch over 5 feet. For males, the basic weight for 5 feet is 106 pounds, with 6 pounds added for every inch over 5 feet. Adjustments must be made for body build. Reduce desired weight by 10 percent for a small frame; increase it by 10 percent for a large frame. Total caloric requirements are based on ideal body weight plus activity.

Many patients on low-calorie diets experience hunger. To satisfy this hunger or appetite, low-calorie foods such as raw vegetables, broth, black coffee or tea, and other unsweetened or diet beverages should be provided. Water and sodium need not be restricted unless there are cardiac complications or edema, and the restrictions are ordered by the physician.

LOW-PROTEIN DIET.—As the name implies, the low-protein diet is made up of foods that furnish only small amounts of protein and consist largely of carbohydrates and fats (e.g., foods such as marshmallows, hard candy, and butter). This diet is used in renal diseases associated with nitrogen retention or liver disorders. Limited amounts of protein are sometimes advocated in certain kidney diseases (such as chronic nephrotic edema). Low-protein diets for renal failure are usually restricted in sodium and potassium, because these two elements are not excreted properly during this condition. In some cases of chronic renal insufficiency, the protein content of the diet is varied, usually between 40 and 60 g per day, so that there will be sufficient complete protein to maintain nitrogen equilibrium.

In some metabolic disturbances, such as amino acids in the urine, protein restriction may be of therapeutic value.

HIGH-RESIDUE DIET.—The high-residue (high-bulk, high-fiber, high-roughage) diet is indicated in atonic constipation, spastic colon, irritable bowel syndrome, and diverticulosis. This diet encourages regular elimination by stimulating muscle

tone, creating softer and larger stools that are more easily propelled through the colon, thereby reducing the pain and cramping that accompany spastic colon or irritable bowel syndrome.

The patient is given a regular diet, with the inclusion of high-residue foods. The main sources of fiber are whole-grain breads and cereals, bran cereals, fresh fruits, and vegetables that are raw or cooked until tender. Whole grain breads and cereals that contain wheat bran have a greater laxative effect than fruits and vegetables, because the bran acts to absorb water within the colon, creating a bulk effect. Fiber intake should be increased gradually to minimize potential side effects of bloating, cramps, and diarrhea. At least one serving of 100 percent wheat bran cereal is recommended daily. Cereals such as raisin bran, Bran Flakes®, Shredded Wheat®, and oatmeal may be used occasionally, but they contain less than half the amount of fiber found in All-Bran® or Bran Buds®. Fresh fruits and vegetables with edible skins, such as apples and grapes, are higher in fiber content than canned fruits or vegetables and their juices.

Dietary intake of refined sugars and starches should be decreased because they are poor sources of fiber. Also, limit white flour products, refined cereals, pies, cakes, and cookies.

Too little fluid in the high-residue diet may cause dehydration and lead to constipation. The patient must drink at least eight 8-ounce glasses of water or other fluids daily, particularly when consuming the recommended amount of bran. Drinking too much alcohol, beverages containing caffeine (such as coffee, cola, tea, and soft drinks), however, can irritate a sensitive colon and can cause dehydration. When possible, use decaffeinated coffee. One or two glasses of water in the morning help to stimulate peristalsis. Excessive intake of foods like dried beans, fruits with seeds and skins, nuts, popcorn, and strong spices may cause irritability, especially during the inflammation period of colon disease states. These foods should be individualized to the patient.

When one is progressing from a low-residue diet after an acute infection or diverticulitis, increase fiber in the diet gradually. Start by adding one serving of 100 percent bran cereal and three servings of whole-grain bread to the low-residue menu pattern. Gradually increase the amount of raw vegetables and fresh fruits to at least four servings per day.

LOW-RESIDUE DIET.—The low-residue diet is indicated in ulceration, inflammation, and other

gastric disorders (such as partial intestinal obstruction or diverticulitis). It is also used in certain postoperative states that affect any part of the GI tract, e.g., a hemorrhoidectomy. Low-residue diets are also used in treating dysenteries of long duration.

The purpose of this diet is to provide non-stimulating, non-irritating, and easily digested material that leaves little residue, thus avoiding mechanical irritation of the GI tract. Various commercially prepared low-residue elemental diet supplements may be given to provide complete nutrition.

LOW-SODIUM DIET.—A low-sodium diet consists of foods containing a very small percentage of sodium, with no salt added in preparation or by the patient. It is impossible to prepare an absolutely sodium-free diet.

The low-sodium diet is indicated when edema is present, in renal diseases, hypertension, and certain cardiac conditions.

The nephrotic patient is often unable to excrete sodium in a normal manner because the kidneys' retention of sodium leads to edema. A low-sodium diet is thus indicated, with no restriction on salt-free liquids. Such patients should be encouraged to drink 2,000 to 3,000 milliliters (ml) of low-sodium fluids daily.

The allowance of sodium in a strict low-sodium diet is 250 to 1,000 mg daily. The allowance of sodium in a moderate low-sodium diet is 2,000 mg or 2 g. Regular diets with no salt added contain 2.4 to 4.5 g of sodium.

Any diet in which the amount of sodium is drastically reduced has possible side effects. The patient who is on this diet regimen must be constantly observed—particularly in warm climates—for lassitude, complaints of weakness, anorexia, nausea and vomiting, mental confusion, abdominal cramps, and aching skeletal muscles. Electrolyte imbalances can have serious consequences. If you observe symptoms such as those described above, notify a medical officer.

BLAND DIET.—A bland diet may be helpful for gastritis, hyperacidity, hemorrhoids, peptic ulcers, and other GI disorders. Dietary management of patients with chronic ulcer disease has been the subject of much controversy. Bland diets have traditionally been used for these patients. However, experiments show that there is no significant difference in the response of

patients with an active duodenal ulcer to a bland diet. Known irritants to the gastric mucosa include alcohol, black pepper, caffeine, chili powder, cocoa, coffee, certain drugs, and tea.

Emphasizing *how* to eat is as important as indicating *what* foods to eat, since there are individual responses to bland diets. Offer the following suggestions to the patient:

- Avoid worry and emotional upsets at mealtime
- Chew food well and eat slowly
- Rest before and after meals
- Avoid foods of extreme temperatures

If fruits and juices between meals cause distress, try including them with meals. Meals must be kept small to reduce gastric acidity and distention. Among foods to avoid in the bland diet are

- fatty meats,
- fried foods,
- whole-grain breads and cereals,
- dried beans and peas,
- cabbage-family vegetables,
- chocolate,
- nuts and seeds, and
- carbonated beverages, caffeine, coffee, and tea.

Patients on a bland diet may use spices and condiments such as allspice, cinnamon, mace, paprika, sage, thyme, catsup, cranberry or mint jelly, and extract and flavorings without chocolate or vinegar.

The bland diet allows a more liberal food selection than other restrictive diets. This diet reduces the number of meals to three, and increases the quantity of foods given. Individualize the diet to the patient.

The “Regular-No Stimulants Diet” (also called “liberal bland”), a type of bland diet, eliminates **only** those items that have been shown scientifically to irritate the gastric mucosa (i.e., alcohol, black pepper, caffeine, chili powder, cocoa, coffee, certain drugs, and tea).

Decaffeinated coffee may be restricted in most types of bland diets. Recent studies show that it causes increased gastric acid secretion and esophageal pressure causing gastric acid reflux in the esophagus. Decaffeinated coffee is only offered on the bland diet

and the regular-no stimulants diet if it is tolerated by the patient.

Chronic and excessive use of antacids to treat hyperacidity and related conditions may result in thiamin deficiency, presumably because of alkaline destruction of thiamin within the bowel lumen. Excessive intake of milk with antacids may cause systemic alkalosis and hypercalcemia. Milk may be contraindicated in patients with allergic reactions or lactose intolerance.

LOW-CARBOHYDRATE, HIGH-PROTEIN DIET.—A low-carbohydrate, high-protein diet is used in the treatment of hypoglycemia. This diet limits simple carbohydrates that are quickly absorbed into the blood. A marked rise in blood sugar stimulates the pancreas to overproduce insulin, which leads to a hypoglycemic state as too much sugar is transported out of the blood.

Individualize the diet to the patient, since hypoglycemic reactions may occur at any time for various reasons. For example, meal skipping, inadequate calorie intake with excessive energy expenditure, and drinking alcohol may precipitate a low-blood-sugar reaction.

The foods may be divided into three to six or more small meals. Liberal amounts of protein and fat are

used, as they are more slowly digested and absorbed. The diet includes meats, fish, poultry, cheese, eggs, fats, low-starch vegetables, and limited amounts of unsweetened fruit and juices, breads, cereals, and high-starch-content vegetables (like corn, peas, and potatoes). Because milk contains the sugar lactose, limit it to 2 cups a day for an adult.

Sweets such as candy, sugar, jams, jellies, soft drinks, and pastries should be avoided to help prevent hypoglycemic reactions. They should be consumed only when necessary to quickly increase blood-sugar levels during a hypoglycemic reaction. If reactions are frequent, it is helpful to carry hard candy for quick and easy use. Handy high-protein snacks to help prevent hypoglycemic reactions may include cheese, peanut butter, milk, and hard-boiled eggs.

SUMMARY

Fulfilling the daily requirement of eating a wide variety of foods, in the correct amounts, will contribute directly to a healthy lifestyle. Well-nourished crewmembers with good health are much more able to resist infections, are able to sleep soundly and awake with a pleasant demeanor. By using your knowledge of diet therapy and nutrition to train and treat your crew, your job will be made significantly easier.

